AN ASSESSMENT OF YOURDAMUNG AND NALYERIN LAKES IN THE JARRAH FOREST REGION OF WESTERN AUSTRALIA

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ABSTRACT

Surveys of fringing and aquatic plants, birds and aquatic macro-invertebrate species were carried out at Lake Yourdamung and Lake Nalverin during 2002. The purpose of this survey was to determine whether Lake Yourdamung, situated on private land, was suitable for inclusion into the Lane-Poole Reserve. Results provided technical and scientific support of an application for land acquisition, which proved to be successful and the 81 ha (182 acres) property was purchased in 2004. After applying wetland functional indices to a range of wetland characteristics, Lake Yourdamung was rated as partially degraded due to draining and clearing (50%) of its fringing vegetation. Despite these interventions, it had retained good water quality and a high diversity of plant, bird and aquatic invertebrate fauna. Lake Nalverin in comparison was in near natural condition but had suffered some degradation due to vehicle damage of the reed beds. Lake Yourdamung with some remedial restoration could in time return to a near-natural condition and form an important wetland environment, the only one on the Bingham River system. Lakes Yourdamung and Nalyerin appear to meet criteria for listing in the Directory of Important Wetlands in Australia.

INTRODUCTION

Since European settlement wetlands have been destroyed at an alarming rate either filled in or drained and used for other purposes. It is only in the past few decades that we have begun to understand the many ecological functions associated with

wetlands and their significance to society (ANCA 1996). Wetlands are among the most productive ecosystems in the world and are a source of substantial biodiversity in supporting numerous species from all of the major groups of organisms – from microbes to mammals. Physical and chemical features such as climate, top-

ography, geology, nutrients, and hydrology help to determine the plants and animals that inhabit various wetlands. The combination of shallow water, high levels of inorganic nutrients, and high rates of primary productivity is ideal for the development of organisms that form the base of a dynamic food web (US EPA 2010).

Lake Yourdamung is located on the head-waters of the Bingham River at 33°12'S and 116°16'E situated some 30km north-east of Collie, Western Australia, while Lake Nalyerin, a further 10 km north east of Yourdamung at 33°08'S and 116°22'E (Figure 1), is fully within state forest on the Harris River. Lake Nalyerin provided a benchmark to compare against as it was in natural forest has had minimal disturbance. Both Lake Nalyerin Lake Yourdamung are natural sumpland type wetlands and as such have an important functional role. Benefits of these wetlands include water storage. flood control and help with groundwater recharge. addition, many of the aquatic and semi-aquatic plants assist with stripping nutrients and harmful contaminants from the

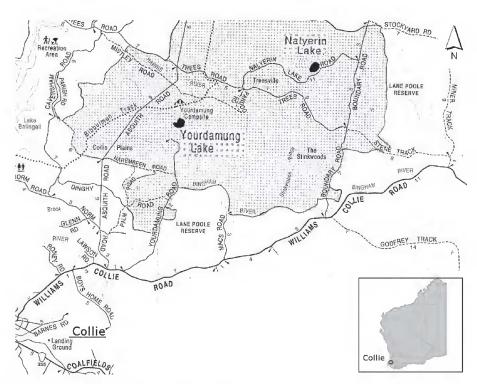


Figure 1. Location of Nalyering and Yourdamung Lakes within the Lane–Poole Reserve and their proximity to Collie, Western Australia.

water improving its quality. The wetlands also provide habitats for many plants and animals, thereby increasing species diversity. Biological monitoring of macro-invertebrate fauna is often done to assess water quality and the health of a system.

A drainage channel across the south west side effectively drained the majority of Lake Yourdamung, reducing the lake area from 30 hectares down to about one hectare. Fringing vegetation from the original lake level was still evident with a new rim of vegetation developing around the current high watermark.

The aim of this investigation was to record and measure vegetation, birds and aquatic invertebrates for Lake Yourdamung and Lake Nalyerin and rate their health and condition. The study further aimed to determine if Lake Yourdamung would revert to natural condition forming a worthwhile addition to the State's conservation areas.

METHOD

Australia has an immense array of diversity, both physical and biological, and to describe and manage this diversity areas of similar ecosystems have been divided into biogeographic regions (ANCA 1996). Biogeographical regions are defined according to biological and environmental attributes, which include terrain, climate, geology,

soil, flora and fauna, Both lakes are situated within the larrah biogeographic region, which is defined as: duricrust plateau of Yilgarn Craton characterised by Jarrah-Marri forest on laterite gravels and, in the eastern part, by Marri-Wandoo woodlands and clavey soils. Eluvial and alluvial deposits support Agonis shrublands. In areas of Mesozoic sediments. larrah forests occur in a mosaic with a variety of species-rich shrublands and warm Mediterranean climate (ANCA 1996). Wetlands of the larrah forest biogeographic region are poorly represented in the Directory of Important Wetlands in Australia (Environment Australia 2001). Only seven wetlands / wetland systems have been listed in the directory as being of national significance. All of these are on the periphery of the region, with five along the southern edge and two on the northern tip.

A visit to the lakes was conducted on the 20 November 2002 to sample plant material for identification and species listing of fringing and aquatic plants (See Appendix 1 for plant species, Appendix 3 for cryptogams). The fringing vegetation area sampled was between the high water mark and the lake edge. Aquatic and semi-aquatic plants from within the lake were also included along with cryptogams. Voucher specimens for study were collected from plants flowering at the time of the survey and returned to the laboratory, where they were processed and later sent to the Western Australian Herbarium. A rapid assessment technique rated the condition of the fringing vegetation and provided a comparative species listing to determine the level of degradation and species composition for both lake systems

Aquatic macro-invertebrate taxa were quantified to determine water quality and lake condition at Yourdamung Lake, whereas only a visual inspection was done at Lake Nalyerin due to time constraints. The method used a timed survey technique where sweeps of the water from surface to lakebed with a fine mesh net were conducted over a 20-second period. Ten sweeps placed at random locations around the lake produced sample specimens, which were returned to the laboratory. Identification of specimens using available keys provided a list of species which, together with a measure of their abundance, were applied to tables published by Davis and Christidis (1997) to determine water quality and the health of the system.

Bird counts of fringing and inlake vegetation at Lake Yourdamung assessed numbers of bird species. The assessment used the standard Birds Australia point transect method (Davies 1983) and sightings and sounds of bird species were recorded at points around the lake. A bird list for Lake Yourdamung is presented in Appendix 2.

Analysis

Data from both lakes (Nalyering and Yourdamung) was applied to a functional capacity rating system which assesses each attribute separately by applying a score based on its condition. All scores are added together to provide an overall total which is compared with a standard. This produces a functional capacity index derived by the following equation for the wetland (adapted from Smith *et al.* 1995) (see Table 3).

FCI = Functional capacity measured / Functional capacity standard

RESULTS

Vegetation species data collected for fringing and aquatic plants are summarised for lakes Yourdamung and Nalyerin in Table 1.

A comparison of the fringing vegetation for both lakes, shows Lake Yourdamung to have

Table 1. Number of fringing and aquatic vegetation species in each lake

	Total number of species	Species common to both	Weed species	
Lake Yourdamung	87	19	28	
Lake Nalyerin	50	19	2	

significantly more weed species than Lake Nalyerin. This is not surprising given that up to 50% of the fringing vegetation was removed to provide pasture for grazing, allowing 28 exotic grasses and weeds to become established compared with only two weeds at Lake Nalverin. Once the weed species were deducted from the species list there was a similar level of species with Lake Yourdamung having slightly higher species numbers. However, only 19 species are common to both lakes and this shows that these two lakes have dramatically different species composition even though they are only 10km apart.

At sweep sites 'Yourdamung', 10 aquatic invertebrate taxa were present in low numbers and of a type consistent with good water quality (Davis and Christidis 1997) (Table 2). Time allowed for only a visual inspection of Lake Nalyerin, which showed a high abundance of shrimp and other crustaceans that are sensitive to

Table 2. Macro-invertebrate taxa and abundance at Yourdamung Lake.

	Taxa A	Abundance
Caddis fly	Trichoptera	1
Clam shrimp	Mollusca	40
Mites	Arichnida	15
Backswimmer	Hemiptera	10
Beetle	Coleoptera Sp	5 5
Beetle	Coleoptera Sp	52 3
Dragonfly	Odonata	2
Midges	Diptera	6
Worms	Oligochaeta	20
Mosquitoes	Diptera	2

pollution and are species consistent with a healthy system. Bird counts using standard bird census techniques over two mornings at Yourdamung returned a species list of 74 birds (See Appendix 3 for complete list).

Water quality was measured twice at Lake Yourdamung during 2002, in July a period of maximum dilution and again in December during the peak of concentration. The results show: pH ranging from 6.0 in July to 7.49 in December and conductivity from 104 to 177 µS/cm (0.06-0.1ppt) respectively. The dissolved oxygen concentration was 83% in July. The pH of Lake Yourdamung is slightly acidic but well within the range of values reported for other lakes in South-Western Australia (Lane et al. 2004, 2011), most of which are more alkaline, probably due to differences in soils and vegetation. Salinity values are very low compared with those of most South West Wetland Monitoring Program (SWWMP) wetlands, as is typical in the Jarrah forest. Lake Yourdamung had a maximum depth in its current state of about 1m, which is lower than that of most SWWMP wetlands.

A functional capacity index of each lake was calculated from wetland attributes that rated the level of degradation and compared against a standard value (Table 3). The functional capacity index was determined by entering the total of all ratings into

Table 3. Showing functional capacity index for both lakes compared with the standard for each function

Function	standard	Yourdamung index	Nalyerii index	n Comments
Water storage	1.0	0.5	1.0	Yourdamung drained
Nutrient cycling	1.0	0.8	1.0	Intact aquatic vegetation
Removal of compounds	1.0	0.6	1.0	Area at Yourdamung reduced
Organic carbon	1.0	0.6	1.0	Area of Yourdamung reduced
Maintain plant community	y 1.0	0.9	0.9	
Maintain detrital biomass	1.0	0.9	1.0	
Spatial structure of habitat	1.0	0.6	1.0	
Connectivity	1.0	0.3	1.0	
Abundance of invertebrate	es 1.0	0.9	0.9	
Abundance of vertebrates	1.0	0.9	0.9	
Water quality	1.0	0.9	0.9	
Total	11.0	7.9	10.6	

the equation from Smith *et al.* (1995).

FCI = Functional capacity measured / Functional capacity standard

Lake Yourdamung = 7.9/11 gives a FCI of 0.71

Lake Nalyering = 10.6/11 gives a FCI of 0.96

A wetland in pristine condition would have a score of 1.0 and both lakes rated highly.

DISCUSSION

The fringing vegetation is subject to inundation annually and forms a natural filtration system that strips and retains nutrients and harmful pollutants from the water improving water quality discharged into the

river system. Comparison of plant diversity for both lakes show the numbers of species to but they have similar distinctly different species composition and this highlights the spatial differences between the two catchments. Lake Yourdamung has more species with higher levels of grasses and weeds, which has resulted from disturbance associated with clearing to produce pastured land. This lake although cleared of some of its fringing vegetation has maintained good water quality and a high diversity of plant, bird and aquatic invertebrate species. The land surrounding the lake is mostly pastured farmland with a narrow strip of vegetation upstream that provides some connectivity to the natural forest to the north. The areas cleared would easily revert to natural vegetation and already show some evidence of sedges and reed beds becoming established, an observation noted during the initial visit and a subsequent visit during 2010. Lake Nalyerin in comparison is in near-natural condition but has some damage due to vehicle traffic crossing reed beds. Some remedial action could rectify this area by resiting tracks and access points.

Lake Yourdamung appears to meet Criteria for listing in the Directory of Important Wetlands in Australia. Such as, It is a good example of a wetland type occurring within a biogeographic region in Australia but, due to a lack of data demonstrating national significance at the time of assessment of wetlands in this region (J. Lane, pers. comm., 3 March 2011), has not been listed. Lake Yourdamung is also not included among the 152 wetlands of the Department of Environment and Conservation's 'South West Wetlands Monitoring Program' which, for historical reasons, has an emphasis on wetlands of the wheatbelt and the coastal plains. Most lakes in this monitoring program are within national parks or nature reserves established prior to 2000 (Lane et al. 2004. 2011). The Yourdamung property was within, but not part of, the Lane-Poole Reserve and had many reasons why it should be added to the reserve. These include: it has a high diversity of plant, bird and animal species; it can be restored back to a natural state: it is within the boundaries of the Lane-Poole Reserve: and it contains habitat suitable for the reintroduction of rare fauna such as Tammar, Woylie and Chuditch also lakes listed in the Directory of Important Wetlands in Australia are poorly represented in the larrah forest biogeographical region. Combined, these reasons provided compelling biological evidence to support the application for land acquisition which was finally achieved in 2004.

Restoration of Lake Yourdamung

A priority following land acquiwas to destock property of cattle and sheep. This significantly reduced grazing pressure allowing natural vegetation to re-establish. As part of the farming activities, a drain cut the south-eastern effectively lowered the lake by 0.8-1.0m altering the entire hydrology of the lake. The lake originally covered about 36 hectares and because of drainage, only about one hectare holds water and actively functions as a sump. To restore this lake to its natural level, forms the next priority and can be achieved by filling in or blocking the drain. Restoration of the damaged fringing vegetation would develop naturally but intervention in the form of replanting and infilling of the vegetation would speed this process. The cost of this type of intervention often prohibits this work.

There was evidence of water birds nesting and foraging in the water during our visit and suggests that this is an important site for many of these species. Lane-Poole Reserve has 120 species of birds and this survey has captured over 60% from this one site, which emphasises its importance. Increasing the area of the lake back to its original size would benefit these species providing increased habitat and maintenance of diversity. Despite the draining and clearing of the lake, the health of this system is in good order. Evidence of this was shown by the cover of aquatic and semi-aquatic plants, with good water quality capable of supporting growth and a suite macroinvertebrate fauna recognised for their capacity to only survive in good quality water. The water was clear and contained no evidence of algal blooms.

Lake Yourdamung drains into the Bingham River through a broad valley flat that is subject to inundation. The lake forms a natural sump and experiences a strong seasonal hydrological cycle of flooding during winter while drying out in summer and is typical of the natural wetlands found in the Jarrah forest. Once restored, it will play a substantial ecological role in the natural functioning of the river system. Restoration of the lake and maintenance of the river system is a responsible goal to preserve the long-term viability of this important habitat and its ecological diversity.

CONCLUSION

Lake Yourdamung showed partial impact from farming and has a high diversity of plant, bird and aquatic animals with fringing vegetation forming an important habitat which would regenerate over time. The property containing the majority of the lake was purchased and incorporated into the Lane–Poole Reserve and will form an important natural wetland for this area.

ACKNOWLEDGEMENTS

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APPENDIX 1. (Vegetation species from Lakes Yourdamung and Nalyering in 2002). Genus marked with an asterisk is a weed species

		Lake Yourdamung	Lake Nalyering	
Amaranthaceae		*		
Alternanthera	nodiflora			
Apiaceae	,			
Daucus	glochidiatus	*	*	
Homalosciadium	homalocarpum	*	*	
Araliaceae	1			
Trachymene	pilosa	*	*	
Asparagaceae	•			
Chamaescilla	corymbosa	*	*	
Sowerbaea	laxiflora	*		
Thysanotus	tenellus		*	
Asteraceae				
*Arctotheca	calendula	*		
*Cotula	coronopifolia	*		
Helichrysum	luteoalbum	*		
*Hypochaeris	glabra	*	*	
Lagenophora	huegelii		*	
Senecio	guadridentatus		*	
Siloxerus	humifusus	*	*	
*Sonchus	asper	*		
*Sonchus	oleraceus	*		
Campanulaceae				
Lobelia	anceps	*	*	
*Monopsis	debilis	*		
Wahlenbergia	gracilenta	*	*	
Centrolepidaceae	G			
Aphelia	cyperoides	*		
Centrolepis	aristata		*	
Characeae				
Chara	sp.		*	algae
Crassulaceae	•			
*Crassula	natans	*		
Cyperaceae				
Baumea	articulata		*	
Baumea	juncea		*	
Isolepis	cyperoides	*		
*Isolepis	marginata	*		
Isolepis	stellata	*		
Dilleniaceae				
Hibbertia	amplexicaulis		*	
Hibbertia	racemosa	*	*	
Hibbertia	stellaris	*		
Elaeocarpaceae				
Platytheca	galioides	*		
2 1010 3 1100 000	0			

				Lake damung	Lake Nalyering
Ericaceae					
Brachyloma	geissoloma			*	
Leucopogon	capitellatus			*	
Leucopogon	propinguus				*
Leucopogon	verticillatus			*	
Fabaceae					
Acacia	huegelii			*	
Acacia	pulchella			*	
Bossiaea	linophylla				*
Eutaxia	virgata			*	
Gastrolobium	ebracteolatum				*
Gompholobium	capitatum			*	
Jacksonia	furcellata			*	
*Lotus	subbiflorus			*	
*Trifolium	dubium			*	
*Trifolium	subterraneum			*	
Viminaria	juncea				*
Geraniaceae	junecu				
Pelargonium	littorale			*	
Goodeniaceae	iniorane				
Dampiera	linearis			*	
Goodenia	filiformis			*	*
Haemodoraceae	juijornus				
Conostylis	aculeata				*
Haloragaceae	исигеши				
Myriophyllum	crispatum			*	
Myriophyllum Myriophyllum	drummondii			*	
Hemerocallidaceae	атиттопан				
Caesia	micrantha			*	*
Dianella	micranina revoluta			*	••
	течонна			^	
Hydrocharitaceae Ottelia	1: C - 1:			*	
	ovalifolia			^	
Iridaceae	.1 .1.			*	
Patersonia	occidentalis		1	*	
Patersonia	umbrosa	var.	umbrosa	*	
Juncaceae	1 1			*	
*Juncus	microcephalus			*	
Juncus	pauciflorus			*	
Lamiaceae	. 1 .			.V-	
*Mentha	pulegium			*	
Lauraceae					.,
Cassytha	racemosa				*
Lentibulariaceae					.,
Utricularia	volubilis				*

				ake damung	Lake Nalyering
Loganiaceae					
Phyllangium	paradoxum			*	*
Lythraceae	P				
*Lythrum	hyssopifolia			*	
Menyanthaceae	J 1 J				
Ornduffia	parnassifolia			*	*
Myrtaceae	1				
Astartea	fascicularis			*	
Corymbia	calophylla			*	
Eucalyptus	marginata			*	
Eucalyptus	rudis			*	*
Hypocalymma	angustifolium			*	
Kunzea	glabrescens			*	
Kunzea	spathulata				*
Melaleuca	lateritia			*	*
Melaleuca	preissiana			*	*
Melaleuca	viminea			*	*
Onagraceae					
Epilobium	billardiereanum	subsp.	cinereum	*	
Orchidaceae					
*Disa	bracteata			-X-	
Elythranthera	emarginata				*
Microtis	brownii				*
Microtis	media	subsp.	media	*	*
Microtis	orbicularis				*
Thelymitra	crinita				*
Orobanchaceae					
*Orobanche	minor			*	
Phyllanthaceae					
Poranthera	microphylla				*
Pittosporaceae					
Billardiera	heterophylla				*
Poaceae					
*Aira	cupaniana			*	
Amphibromus	nervosus			*	
*Briza	maxima			*	
*'Briza	minor			*	
*Bromus	hordeaceus			*	
*Holcus	lanatus			*	
*Hordeum	leporinum			*	
*Lolium	rigidum			*	
Microlaena	stipoides				*
Neurachne	alopecuroidea			*	
*Polypogon	monspeliensis			*	
*Rostraria	cristata			*	
*Vulpia	bromoides			*	

		Lake Yourdamung	Lake Nalyering
Polygonaceae			
Persicaria	prostrata	*	
*Rumex	brownii	*	
Proteaceae			
Banksia	attenuata		*
Banksia	littoralis	*	
Hakea	prostrata		*
Hakea	varia	*	
Persoonia	longifolia	*	
Ranunculaceae			
Ranunculus	amphitrichus		*
Rosaceae			
*Acaena	echinata		*
Rutaceae			
Boronia	dichotoma	*	
Stylidiaceae			
Levenhookia	dubia	*	
Levenhookia	pusilla		*
Stylidium	brunonianum	*	*
Stylidium	induratum	*	
Stylidium	inundatum		*
Stylidium	roseoalatum	*	
Stylidium	sp.		*
Typhaceae			
*Typha	orientalis	*	
Xanthorrhoeaceae			
Xanthorrhoea	preissii	*	
Zamiaceae			
Macrozamia	riedlei		*

APPENDIX 2. Birds of Yourdamung Lake

Ool Emu Dromaius novaehollandiae O35 Brush Bronzewing O46 Buff-banded Rail Gallirallus philippensis O56 Dusky Moorhen Gallinula tenebrosa O57 Purple Swamphen Porphyvio porphyvio O97 Little Black Cormorant Phalacrocorax sulcirostris I00 Little Pied Cormorant Phalacrocorax melanoleucos I179 Australian White Ibis I82 Yellow-billed Spoonbill Platalea flavipes I88 White Faced Heron Ardea pacifica Cormorant Phalacrocorax melanoleucos I189 Pacific Heron Ardea novaehollandiae I89 Pacific Heron Ardea pacifica Cormoratius I207 Australian Shelduck Tadorna tadornoides I208 Pacific Black Duck Anas superciliosa I210 Chestnut Teal Anas giberifrons I211 Grey Teal Anas giberifrons I212 Australasian Shoveler Anas rhynchotis I213 Spotted Harrier Circus assimilis I219 Swamp Harrier Circus assimilis I220 Collared Sparrowhawk Accipiter cirrhocephalus I221 Brown Goshawk Accipiter cirrhocephalus I222 Collared Sparrowhawk Accipiter cirrhocephalus I223 Australian Hobby Falco longipennis I224 Vedge-tailed Eagle Aquila audax I225 Australian Kestrel I226 Southern Boobook Ninox novaeseelandiae I237 Peregrine Falcon Falco enchroides I240 Australian Kestrel I241 Southern Boobook Ninox novaeseelandiae I242 Southern Boobook Office White-tailed Black Cockatoo I253 Red-tailed Black Cockatoo I254 Port Lincoln Ringneck Barnardius zonarius semitorquatus I255 Australian Hobby Falco longipennis I260 Red-capped Parrot Purpureicephalus spuruius I276 Barnardius zonarius semitorquatus I277 Peregrine Falcon Padargus strigoides I278 Port Lincoln Ringneck Dacelo novaeguineae I279 Rainbow Bee-eater Merops ornatus I280 Red-capped Parrot Neophema elegans I281 Royling Kookaburra Dacelo novaeguineae I282 Australian Ripidura fuliginosa I283 Richard's Pipit Anhus novaeseelandiae I284 Shining Bronze Cuckoo I285 Carlet Robin Petroica goodenovii I286 Parto Rosello Petroica goodenovii I286 Parto Rosello Petroica goodenovii I286 Partoica goodenovii I286 Partoica goodenovii I287 Peregrine Falcon Petroica goodenovii I288 Podarus Podarus Strigoides I289 Restless Flycatcher	RAOU	Common Name	Scientific Name
O35 Brush Bronzewing O46 Buff-banded Rail O56 Dusky Moorhen O57 Purple Swamphen O97 Little Black Cormorant O58 Purple Swamphen O99 Little Black Cormorant O19 Little Pied Cormorant O10 Little Pied Cormorant O10 Little Pied Cormorant O10 Little Pied Cormorant O110 Australian Shoucla O210 Australian Shoucla O210 Australian Hobby O110 Anas suberciliosa O210 Australian Hobby O110 Anas suberciliosa O110 Chestnut Ead Anas castanea O110 Ardea novaehollandea O211 Ardea novaehollandea O2110 Chestnut Ead Pack Coressimilis O2110 Chestnut Ead Pack Coressimilis O2110 Chestnut Ead Pack Eadorana O2110 Chestnut Eadorana Anas suberciliosa O2110 Chestnut Eadorana Anas suberciliosa O2110 Chestnut Eadorana Anas suberc	001	Fmu	Dromaius novaehollandiae
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381 Red-capped Robin Petroica goodenovii		Restless Flycatcher	Myiagra inquieta
	380		Petroica multicolor
Western Yellow Robin Epopsaltria grisogularis			
	384	Western Yellow Robin	Epopsaltria grisogularis

Appendix 2 (cont.)

RAOU	Common Name	Scientific Name
398	Golden Whistler	Pachycephala pectoralis
408	Grey Shrike-thrush	Colluricincla harmonica
415	Australian Magpie-lark	Grallina cyancoleuca
424	Black-faced Cuckoo shrike	Coracina novaehollandiae
430	White-winged Triller	Lalage sueurii
448	White-fronted Chat	Ephthianura albifrons
463	Western Gerygoyne	Gerygone fusca
472	Western Thornbill	Acanthiza inornata
476	Inland Thornbill	Acanthiza apicalis
486	Yellow-rumped Thornbill	Acanthiza chrysorrhoa
524	Clamorous Reed-warbler	Acrocephalus stentoreus
532	Spendid Fairy-wren	Malurus splendens
547	Dusky Woodswallow	Artamus cyanopterus
565	Spotted Pardalote	Pardalotus punctatus
574	Silvereye	Zosterops lateralis
578	White-naped Honeyeater	Melithreptus lunatus
592	Western Spinebill	Acanthorhynchus superciliosus
597	Brown Honeyeater	Lichmera indistincta
608	Singing Honeyeater	Lichenostomus virescens
631	New Holland Honeyeater	Phylidonyris novaehollandiae
637	Little Wattlebird	Anthochaera chrysoptera
638	Red Wattlebird	Anthochaera carunculata
651	Red-eared Firetail	Emblema oculata
697	Grey Currawong	Strepera versicolor
702	Grey Butcherbird	Cracticus torquatus
705	Australian Magpie	Gymnorhina tibicen
930	Australian Raven	Corvus coronoides
976	Striated Pardalote	Pardalotus striatus

APPENDIX 3. Mosses and Lichens (Cryptogams) of Yourdamung Lake

FAMILY_NAME	GENUS	SPECIES	Life Form
Cladoniaceae	Cladia	aggregata	lichen
Collemataceae	Collema	leucocarpum	lichen
Hypogymniaceae	Menegazzia	caesiopruinosa	lichen
	Menegazzia	fertilis	lichen
Lecanoraceae	Maronina	hesperia	lichen
Lecanoraceae	Pyrrhospora	laeta	lichen
Lecanoraceae	Tephromela	alectoronica	lichen
Lecideaceae	Lecidea	capensis	lichen
Lecideaceae	Lecidea	tragorum	lichen
Lichinaceae	Pyrenopsis	sp. (D. Richardson 962)	lichen
Parmeliaceae	Flavoparmelia	marchantii	lichen
Parmeliaceae	Parmotrema	cooperi	lichen
Parmeliaceae	Xanthoparmelia	fumigata	lichen
Parmeliaceae	Xanthoparmelia	nana	lichen
Parmeliaceae	Xanthoparmelia	oleosa	lichen
Peltulaceae	Peltula	obscurans	lichen
Pertusariaceae	Ochrolechia	pallescens	lichen
Pertusariaceae	Pertusaria	scaberula	lichen
Physciaceae	Amandinea	punctata	lichen
Physciaceae	Buellia	disciformis	lichen
Physciaceae	Buellia	dissa	lichen
Ramalinaceae	Ramalina	inflata	lichen
Sematophyllaceae	Sematophyllum	subhumile	moss
Usneaceae	Usnea	dasaea	lichen
Usneaceae	Usnea	subalpina	lichen